♦VMU Notes & News♦

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It is generally accepted that healthy animals are required for reliable research results. When performing research, the presence of a pathogen can create confounding effects that interfere with the applicability of research results. This is most obvious in studies of the immune system, but has been shown to be true in other disciplines as well (see references at end for additional reading). This issue of the VMU News will review the steps that are taken in the VMU to ensure that the health of the animals is protected.

Level One: Healthy Animals

The first level of protection that exists in the VMU is procurement of healthy animals from reliable sources. If the colonies have never been exposed to the known rodent pathogens, the potential confounding effect of these pathogens on the research does not exist. In the majority of cases, animals in the VMU are obtained from commercial vendors who maintain an intensive monitoring program for the animals that they produce. The vendors supply health records, and these records are reviewed prior to allowing entry of the animals.

In other cases, the animals are obtained from non-commercial sources, usually other institutions and universities. In these cases, the VMU requires that a health history be provided to the veterinary staff prior to shipment so that appropriate plans may be made if problems are identified. The health history must be current (within 90 days of shipment) and must contain proof that the animals are free of all pathogens that we screen for in the VMU. The VMU Quarantine policy is posted on its web page and investigators are encouraged to review this policy when planning to obtain animals from non-commercial sources. It is important to note that OHSU is considered a non-commercial source of animals and that the VMU Quarantine policy applies to animals received from OHSU.

Level Two: The Cage

The second level of protection for rodents in the VMU is the cage. The use of ventilated racks and cages with filter-tops effectively isolate each cage from the others in the room. The simplest way to think about this is to consider each filter-topped cage to be a "little room" – the ventilated cages even have their own climate control!

Level Three: The Changing Station

Once the filter-top is removed from the cage, the isolation is compromised. For effective isolation, the animals must be protected against aerosol and direct contact exposure to potential pathogens. To prevent aerosol exposure of pathogens, we use a changing station. Although these stations are not true class IIA biological safety cabinets, they are designed to function in a manner analogous to this design. Air from the room is HEPA filtered prior to being passed over the work surface, ensuring that the animals are not exposed to any potential pathogens that might be in the room. Air that has passed over the work surface is HEPA filtered prior to exhausting into the room. This ensures that any pathogens being shed by the animals in the cage are not exhausted into the room where they might affect other animals and people.

It is important to understand the proper way to operate the changing stations. In all cases, please allow 5 minutes for the machine to warm up so that the fans are functioning to provide maximum protection. Always clean the changing station work surface with one of the available disinfectants (Novalsan, Quinticare) before and after use to help minimize exposure of your animals to a variety of pathogens. Minimize the amount of equipment in the changing station so that you don't block the airflow through the machine. If you have questions regarding the proper use of the changing stations, please ask one of the VMU staff for assistance.

The changing station protects the animals from exposure to other diseases, but it also protects you from exposure to allergens and zoonotic (animal to people) pathogens. Proper use of the changing station will help maintain your health as well.

Level Four: Hand Disinfection

The changing station aids in protection from aerosol pathogen exposure, but cannot prevent direct

contact exposure. Fomites are inanimate objects that carry pathogens from one host to the next. In the animal facility, the gloves on our hands and the forceps that are often used to move animals are fomites that play an important role in disease transmission. To properly isolate one filter-topped cage from another, you must follow fomite disinfection procedures between cages.

In brief, all equipment and surfaces on the interior of the cage are considered "clean." This includes the inside of the cage, the inside of the filter-top, the bottle, the wire-top, the feed, and the animals themselves. All equipment and surfaces outside of the cage are considered "dirty." These include the exterior of the cage and filter-top, the cage cards, the changing station work-surface, your pens, your syringes, and anything else that is not contained within the inside of the cage. If your gloved hands or the forceps have touched anything that is "dirty," you must disinfect them prior to handling anything that is in the interior of the cage. The VMU requires that 30% dilute bleach be used as the disinfectant because of its superior disinfection capabilities (although there are exceptions to this requirement). For your convenience, the VMU staff provides spray bottles of properly diluted bleach, made fresh daily, in each of the animal rooms. If you are unsure of the proper disinfection techniques, please contact a member of the VMU staff for a demonstration.

As you move clean caging through the hallways, you should take steps to protect the equipment. *It is important to realize that you are protecting the caging from the hallway that you are traveling through*. The hallway is the least protected area of the VMU with the most potential for cross-contamination as dirty cages and cages containing animals are moved through these corridors. By covering clean caging equipment as you move it through the galls, you help prevent the introduction of pathogens into your animal colonies.

Level Five: The Animal Room

The animal room is the next level of protection for the rodents housed in our facility. By distributing the colonies of animals throughout smaller rooms in the animal facility, outbreaks of disease can be contained when identified. In general, one VMU staff member is assigned to each room and investigators with similar research goals are combined. The rooms are thoroughly cleaned at least weekly by the animal care staff to help minimize the potential pathogen load in the room.

Level Six: Personal Protective Equipment (PPE)

The VMU PPE policy requires that all personnel don an isolation gown and shoe covers prior to entering an animal room. If the room is in quarantine, a hair covering must be donned as well. If any cages are to be opened, gloves and a mask must also be used. *Again, it is important to realize that you are protecting the animal room from the hallway that you just traveled through.* The hallway is the least protected area of the VMU with the most potential for contamination as dirty cages and cages containing animals are moved through these corridors. By donning the PPE, you are helping prevent the distribution of any potentially infectious pathogens that were picked up by your clothes as you traveled the halls.

Like the changing station, proper use of PPE will help protect you from exposure to allergens and zoonotic (human to animal) pathogens.

Level Seven: Research Tools & Procedure Rooms

As you use procedure room space and research tools (examples are scales, anesthesia machines, behavioral testing apparatuses), you should take steps to disinfect the equipment. This is especially critical if the equipment is used by personnel with animals in different rooms in the VMU or housed at OHSU. Improper disinfection allows potential cross-contamination from different colonies (within the VMU or between the VMU and OHSU) to occur. By disinfecting your tools before use, you help prevent the introduction of pathogens into the housing spaces. If you have questions regarding appropriate protection of equipment, please contact a member of the VMU staff for assistance.

A member of the animal care staff cleans procedure rooms at least weekly. You are responsible for cleaning work surfaces before and after each use to help prevent the spread of

pathogens. Always be sure to clean surfaces before use, as you should not assume that the people who used it before you did an appropriate job.

Level Eight: The Sentinel Program

Another important level of protection is the sentinel program. This surveillance allows us to determine what pathogens are in the facility so that we can work to prevent further disease spread.

Sentinel mice are young, immunologically naïve mice and rats that are placed in cages containing pooled dirty bedding from the animals in the colony. The animals are housed on dirty bedding for a minimum of 3 weeks. At that time, one member of each pair is euthanized and samples are collected for analysis. If a viral pathogen is found, the serum is sent to a second lab for additional testing. Serum is also collected from the other sentinels in the room. If these results are also positive, the room is quarantined and a quarantine plan is established in by the VMO in consultation with the research staff. Once a room or area is suspected as positive for a pathogen, three consecutive negative tests are required to end the quarantine.

Disaster Planning: Protecting Your Investment

Disasters in the animal facility can come in many different forms. It could be a devastating rapid viral outbreak with 90% mortality (e.g. mousepox) or an earthquake that destroys the building housing your animals. The VMU could easily be the target of domestic terrorists with an animal rights agenda, and it could be an inadvertent target of international or domestic terrorists with an anti-American agenda. The events of recent years have shown everyone that we need to be prepared.

The face of research using animals has changed significantly. In the past, strains of mice that were easily available from commercial sources were the industry standard. Today, the vast majority of the strains housed in the VMU are specific to this site. Many of these strains have taken decades to produce. When planning your colony management, it is strongly suggested that you consider cryopreservation for your most valuable strains and lines of mice. Although the strains will be preserved at generation "H," if the disaster happens at generation "P" you will not have to restart with generation "A," saving significant time and money. In many cases, millions of dollars of grants are invested in these strains of mice. Investing approximately $8,000 per strain for periodic cryopreservation will provide you with relatively inexpensive insurance in case of disaster. Contact the VMU for suggestions of how to implement a cryopreservation plan for your valuable colonies.

References:

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Lussier G. 1988. Potential detrimental effects of rodent viral infections on long-term experiments. *Vet Res. Commun* 12(2-3): 199.

Nicklas W et al. 2002. Recommendations for the health monitoring of rodent and rabbit colonies in breeding and experimental units. *Lab Animal* 36(1): 20.

News and Updates:

Building 6 Renovation:

The Building 6 facility is now open and in the process of receiving animals. As always, if you need additional housing space for your animal needs, please contact Dr. Hickman. We will attempt to accommodate your requirements as quickly as possible.

Staff Achievements:

Randy and Paul H. have successfully achieved the requirements for the Assistant Laboratory Animal Technician (ALAT) certification level established by the American Association for Laboratory Animal

Science (AALAS). We are extremely proud of their success!

Additional VMU Services:

The VMU staff has become proficient in multiple procedures, including tail snip collection for genotyping, blood collection, injection techniques, other tissue collection, and anesthesia support. If you would like additional bench time, please consider arranging for the VMU staff to assist with the routine procedures that your research staff currently performs in the VMU. The cost for this service is $25/hour, billable in 15-minute increments. As always, training is at no cost to you, so please do not hesitate to contact us if your lab needs training in any techniques.

VMU Has A Web Page:

Thanks to Michelle, the VMU has developed a web page to help facilitate communication about issues arising in the VMU. The URL is at the base of each page of this newsletter. Visit this site for back issues of the newsletter, policies regarding the VMU, information sheets, and forms to facilitate animal use. The site will be expanding, so check back frequently!